

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 04 APR 2005

WIPO PCT

Applicant's or agent's file reference 000172WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/23860	International filing date (day/month/year) 29 July 2003 (29.07.2003)	Priority date (day/month/year) 29 July 2002 (29.07.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): G06K 9/36; H04B 1/66; H04N 1/41, 7/12 and US Cl.: 382/239, 251; 375/240.03, 240.2; 348/404.1; 358/426.08		
Applicant QUALCOMM INCORPORATED		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

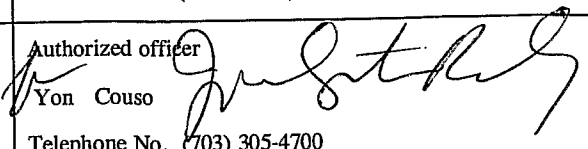
2. This REPORT consists of a total of 8 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 23 February 2004 (23.02.2004)	Date of completion of this report 04 March 2005 (04.03.2005)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703)305-3230	Authorized officer Yon Couso  Telephone No. (703) 305-4700

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed.
- ☒ the description:
pages 1-14 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the claims:
pages 15-20, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the drawings:
pages 1-5, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims <u>8, 10, 11, 15-20, 23</u>	YES
	Claims <u>1-7, 9, 12-14, 21, 22, 24-29</u>	NO
Inventive Step (IS)	Claims <u>1-7, 9, 12-14, 21, 22, 24-29</u>	YES
	Claims <u>8, 10, 11, 15-20, 23</u>	NO
Industrial Applicability (IA)	Claims <u>1-29</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet

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VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Claim 21 is objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or contents thereof: Consider replacing "se to" on line 2 of the claim with --set of--.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claims 9-11 and 17-23 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims 9-11 and 17-23 are indefinite for the following reason(s): Claims 9-11 and 17-23 are indefinite because they are multiple dependent claims depending from multiple dependent claims. These claims create confusion in determining how many prior claims to which each are actually referred.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

V. 2. Citations and Explanations:

Claims 1-7, 9, 12-14, 21, 22, and 24-29 lack novelty under PCT Article 33(2) as being anticipated by Watson over Watson (U.S. Patent 5,629,780, "Watson").

In regards to claim 1, Watson discloses an apparatus (Fig 2) comprising: a source generator (Fig 2, ref no 30) configured to convert image information into digital image information; and an encoder (ref no 12, Fig 2) coupled to the source generator, the encoder configured to receive the digital image information from the source generator and comprising: a parameter generator (ref no 36, Fig 2) to output at least a first set of parameters (optimized quantization matrix, Fig 2); and a first image compressor (ref nos 34, 38, and 40, Fig 2) coupled to the parameter generator, the first image compressor to compress the digital image information using the first set of parameters.

In regards to claim 2, Watson further discloses the parameter generator comprising: a second image compressor (ref no 56, Fig 3) to compress the digital information using a second set of parameters; and a processor (ref no 90, Fig 4) coupled to the first and second image compressors, the processor to output the second set of parameters, the processor to adjust the second set of parameters (ref no 92, Fig 4) and output a third set of parameters as the second set of parameters, if the use of the second set of parameters results in a selected data bit rate, and otherwise, to output the second set of parameters as the first set of parameters (ref no 90, Fig 4).

In regards to claim 3, Watson further discloses the parameter generator further comprising: a statistic generator (ref no 62, Fig 3) coupled to the processor, the statistic generator configured to generate a statistical analysis (pooled error); and wherein the processor adjusts the second set of parameters based on the statistical analysis (ref no 64, Fig 3).

In regards to claim 4, Watson further discloses the parameter generator comprising: a processor (ref no 90, Fig 4) to output the first set of parameters, the processor to adjust the first set of parameters to generate a second set of parameters if the use of the first set of parameters results in a selected data bit rate, and to output the second set of parameters as the first set of parameters.

In regards to claim 5, all the additional elements set forth in this claim have been addressed in the argument of claim 3.

In regards to claim 6, Watson further discloses the statistical analysis either involves analyzing bits per pixel for images (col 12, line 45) or determines the effectiveness of the first set of parameters (col 9, line 47).

In regards to claim 7, Watson further discloses the first set of parameters including Q-steps (ref no 35, Fig 3) and the first image compressor comprises: a transform module (ref no 34, Fig 2) to convert the digital image information from spatial to frequency domain, the transform module to generate transform coefficients; a quantization module (ref no 38, Fig 2) to quantize the transform coefficients using the Q-steps; and a variable length coding module (ref no 40, Fig 2) to compress the quantized transform coefficients.

In regards to claim 9, Watson further discloses the first set of parameters including Huffman code tables (col 5, line 29) and the variable length coding module includes a Huffman engine (col 5, line 27) to compress the quantized transform coefficients using the Huffman code tables.

In regards to claim 12, all the elements set forth in this claim have been addressed in the argument of claim 4.

In regards to claim 13, all the additional elements set forth in this claim have been addressed in the argument of claim 7.

In regards to claim 14, Watson further discloses the first set of parameters including the first Q-steps (ref no 35, Fig 3) and

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

adjusting the first set of parameters comprises: adjusting the first Q-steps to generate the second set of parameters (ref nos 24-92, Fig 4) if the use of the first set of parameters results in the selected data bit rate, and outputting the second set of parameters (ref no 90, Fig 4) as the first set of parameters.

In regards to claim 21, Watson further discloses in ref no 62, Fig 3, the adjusting the first set of parameters comprises adjusting the first set of parameters based on a statistical analysis (pooled error) to generate the second set of parameters.

In regards to claim 22, Watson further discloses in col 12, line 45, the adjusting the first set of parameters comprising adjusting the first set of parameters based on a bits per pixel analysis to determine if the use of the first set of parameters results in the selected data bit rate.

In regards to claims 24, 25, and 26, all the elements set forth in these claims have been addressed in the arguments of claims 1, 2, and 4, respectively.

In regards to claims 27, 28, and 29, all the elements set forth in these claims have been addressed in the arguments of claims 1, 2, and 4, respectively.

Claims 11 and 23 lack an inventive step over Watson (U.S. Patent 5,629,780, "Watson") as applied to claims 1 and 12, respectively.

In regards to claim 11, Watson does not expressly disclose the digital image information being at least a portion of a film.

However, Watson does disclose the image as a digital file containing pixel data (col 5, line 21) and places the invention in the context of television systems (col 1, line 30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate at least a portion of a film as Watson's image.

The suggestion/motivation for doing so would have been because film has been an industry standard image recording medium and is compatible with Watson's invention.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use at least a portion of a film as digital image information to obtain the invention as specified in claim 11.

In regards to claim 23, Watson does not expressly disclose the selected bit rate depending on either one of a maximum bit rate as allowed a limited bandwidth or an average bit rate over a certain time period.

However, Watson does place the invention in the context of television transmission (col 1, line 30) and computer communication networks (col 1, line 35), traditionally bandwidth limited systems. Perceived image quality is important (col 2, line 2) and certain images should be transmitted at a higher bit rate in order to preserve their informational content (col 2, line 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have Watson's selected bit rate (ref no 90) depend on either one of a maximum bit rate as allowed a limited bandwidth or an average bit rate over a certain time period.

The suggestion/motivation for doing so would have been to optimize the perceived image quality in a bandwidth limited system, such as a television transmission or computer communications network.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the selected bit rate depend on either one of a maximum bit rate as allowed a limited bandwidth or an average bit rate over a certain time period, as specified in claim 23.

Claims 8, 15, and 16 lack an inventive step over Watson (U.S. Patent 5,629,780, "Watson") as applied to claims 7 and 13, in combination with Pian et al (U.S. Publication 2002/0021754 A1, "Pian").

In regards to claim 8, Watson does not expressly disclose the first set of parameters further including frequency weight mask (FWM) tables and the quantization module to quantize the transform coefficients using FWM tables.

Pian teaches parameters including frequency weight mask tables (paragraphs 0034 and 0036) and quantizing transform coefficients using FWM tables (paragraph 0037).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Pian's FWM into Watson's matrices (ref no 35, 66, and 84).

The suggestion/motivation for doing so would have been to better control the encoded data rate in a video compression procedure (Pian, paragraph 0011).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate frequency weight mask tables into the first set of parameters and quantize the transform coefficients using FWM tables and Q-steps, as specified in claim 8.

In regards to claim 15, all the additional elements set forth in this claim have been addressed in the argument of claim 8.

In regards to claim 16, all the additional elements set forth in this claim would have been obvious in light of the argument of claim 8 with respect to Watson, ref no 35, 66, and 84.

Claims 10 and 17-20 lack an inventive step over Watson (U.S. Patent 5,629,780, "Watson") as applied to claims 7 and 13, in combination with Lee et al (U.S. Patent 5,576,767, "Lee").

In regards to claim 10, Watson does not expressly disclose the first set of parameters further including an adaptive block size discrete transform (ABSDCT) threshold and the transform module comprising an ABSDCT module to convert the digital image information from spatial to frequency domain using ABSDCT according to the ABSDCT threshold.

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Lee teaches ABSDCT as a replacement for DCT (col 7, line 37, and col 4, line 27), parameters including an ABSDCT threshold (cost function, col 7, line 60), and converting digital image information from spatial to frequency domain using ABSDCT according to the ABSDCT threshold (Fig 6 and 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Lee's teachings into Watson's method.

The suggestion/motivation for doing so would have been to provide an improved method for compressing image data for transmission and for reconstruction of the image data upon reception by encoding a high precision reproduction of pixel data at a minimum transmission data rate (Lee, col 2, lines 33-40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include an ABSDCT threshold in the first set of parameters, and have the transform module comprising an ABSDCT module to convert the digital image information from spatial to frequency domain using ABSDCT according to the ABSDCT threshold, as specified in claim 10.

In regards to claim 17, all the additional elements set forth in this claim have been addressed in the argument of claim 10.

In regards to claim 18, all the additional elements set forth in this claim would have been obvious in light of the argument of claim 10 with respect to Watson, ref no 35, 66, 84, and 90.

In regards to claim 19, all the additional elements set forth in this claim have been addressed in the argument of claim 9.

In regards to claim 20, all the additional elements set forth in this claim would have been obvious in light of the argument of claim 19 with respect to Watson, ref no 35, 66, 84, and 90.

----- NEW CITATIONS -----